APEX ENVIROTECH, INC.

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March 14, 2006

Mr Cliff Ives
Sonoma County Department of Health Services
Environmental Health Division
475 Aviation Boulevard, Suite 220
Santa Rosa, California 95403

Subject: **Workplan for Additional Subsurface Investigation and Interim Remedial Action**
Rotten Robbie
7200 Healdsburg Avenue, Sebastopol, California
SCDHS Site #00001569 and NCRWQCB Site #1TS0244
Apex Project No ERA02.005

Dear Mr. Ives:

Apex Envirotech, Inc. (Apex) has been authorized by Rotten Robbie (former Dave's Pit Stop (Pit Stop)) to provide this workplan proposing the installation of additional groundwater monitoring wells and implementation of an interim remedial action for the subject site (Figures 1 and 2) This workplan has been prepared in response to the Sonoma County Environmental Health Department's (SCEHD) letter dated January 24, 2006 (Appendix A).

This workplan is based in part, on information obtained by Apex from Rotten Robbie and Pit Stop, and is subject to modification as newly acquired information may warrant.

BACKGROUND

The site is currently an operating gasoline station with a car wash and food mart that retails unleaded gasoline, diesel fuel, and red dyed (off-highway) diesel fuel

1988 - Four gasoline underground storage tanks (USTs) and associated piping were removed from the site The former USTs were replaced by five double-walled steel tanks (T-1 through T-5. In November 1988, Delta Environmental Consultants, Inc. (Delta) of Rancho Cordova, California, installed groundwater monitoring wells MW-1 through MW-4 on-site.

1989 - Delta installed additional groundwater wells MW-5 and MW-6 off-site and five vapor extraction wells VEW-1 through VEW-5 on site during the second quarterly monitoring event. In November 1989 the station was rebuilt. Product lines from the tanks installed in 1988 were replaced with new product lines. During the rebuild, vapor extraction well VEW-5 was properly abandoned to make space for the new dispenser islands.

March 29, 1990 - Aegis Environmental, Inc. (Aegis) of Roseville, California, installed an additional off-site groundwater monitoring well (MW-7).

February 1991 - Aegis began vapor extraction using a catalytic oxidizer for off-gas treatment. The unit operated sporadically until October 1991.

October 1992 - Aegis installed a vapor extraction system. This system began continuous operation in November 1992. The operation of this unit was discontinued in October 1993, in anticipation of a system with higher flow capacity.

August 1994 - Apex was retained as the consultant for the site. Apex submitted a report, *Corrective Action Plan (CAP)*, dated October 14, 1994. Apex began quarterly monitoring at the site in August 1994.

May 1995 - Pit Stop personnel, trained in the handling and management of petroleum products, began weekly floating liquid hydrocarbons (FLH) removal from well MW-4.

February 1996 - Apex submitted a workplan addendum proposing the advancement of two on-site Hydropunch® borings and modifications of one monitoring and one vapor extraction well. The modifications were proposed to facilitate soil and groundwater remediation.

September 30, 1996 - Apex supervised the drilling of two Hydropunch® borings and the enlargement of monitoring well MW-4 at the site. The results of the work were documented by Apex in the report, *Hydropunch Investigation, Well Modification, and Fourth Quarter 1996 Quarterly Groundwater Monitoring Report,* dated November 26, 1996.

April 1, 1997 - A PetroTrap® passive skimmer was installed in monitoring well MW-4. The skimmer was drained and monitored on a weekly basis by Pit Stop personnel. During the second quarter 1998 groundwater sampling event, free product was no longer observed in monitoring well MW-4. As a result, the skimmer was removed to assess FLH thickness. Free product was absent until November of 1998, at which time a free product thickness of 2.8 inches was observed. The skimmer was reinstalled in well MW-4 in January 1999 to recover any remaining FLH.

May 5, 1999 - Soil vapor extraction pilot testing was performed at the subject property to assess the post remedial status following the 1993 soil vapor extraction (SVE) operation.

May 12, 1999 - Apex submitted a report, *Final Remediation Plan and Second Quarter 1999 Groundwater Monitoring Plan (FRP),* which outlined the corrective action for the site. The SCEHD approved the FRP on June 21, 1999.

August 9, 1999 - Apex submitted a report, *Workplan for Well Modification/ Installation and Response to County Letter,* detailing the installation of five air sparge points and the conversion of two existing monitoring wells to SVE wells. The SCEHD conditionally approved the workplan in a letter dated December 22, 1999.

January 27, 2000 - Apex submitted a report, *Workplan Addendum for Well Modification/Installation and Response to County Letter,* detailing the installation of two new monitoring wells for the site. The SCEHD approved the Workplan Addendum in a letter dated March 27, 2000.

May 15 -19, 2000 - Apex supervised the installation of two groundwater monitoring wells (MW-8 and MW-9), modified two existing wells (MW-1 and MW-2) from two-inch to four-inch diameter wells, and installed four air sparge points. Results from the well installation and well modification are documented in the report, *Results Report for Well Installation/Modification, Second Quarter 2000 Groundwater Monitoring, and Addendum to the Final Remediation Plan Report,* dated August 9, 2000.

October 2, 2002 - The remediation system was installed and start-up occurred.

September 30, 2003 - Apex submitted a workplan, and on October 3, 2003, submitted a workplan addendum proposing the expansion of the remediation system and to remove contaminated soil from a dispenser pan and product line upgrade. On October 20, 2003, the SCEHD approved the workplan addendum in a letter.

November 11, 2003 - Apex submitted a workplan, *Monitoring Well MW-5 Destruction Recommendation and Workplan,* proposing the abandonment of well MW-5 due to future site development plans.

November 14, 2003 - Apex personnel supervised the upgrade of the dispenser pans and product lines at the site. Soil samples were collected from beneath the product lines at approximately 3 feet below ground surface (bgs).

December 12, 2003 - Apex supervised the abandonment of well MW-5 by Woodward Drilling.

December 19, 2003 - Apex supervised the installation of three air sparge (AS) wells (AS-6, AS-7, and AS-8).

January 2004 - Apex personnel connected the new air sparge wells to the sparge system with horizontal supply lines. Also, MW-4 was integrated into the SVE system as a vapor extraction point.

ADDITIONAL SUBSURFACE INVESTIGATION

Apex proposes to install five new groundwater monitoring wells in the second and third aquifer zones (see table below) to vertically and laterally define the dissolved-phase plume. Apex proposes to install one additional deep zone groundwater monitoring well (MW-9E) on the subject property and two sets of nested deep zone wells (MW-7E/F and MW-8E/F) off-site. The proposed well locations are shown on Figure 3.

Monitoring Well Nomenclature

Due to the proposed ongoing investigation in several zones of the aquifer, Apex has prepared the following table of well nomenclature. All wells (existing and proposed) will be identified in accordance with the table below:

Aquifer Zone Depth (feet)	Zone ID
0-65	S or first zone
80-115	D or second zone
130-150	E or third zone
155-175	F or fourth zone

Existing wells MW-1 through MW-8 will be renamed as wells MW-1S through MW-8S and well MW-9 will be renamed as well MW-9D from this point forward. Well construction details for the wells currently associated with the site are in Table 1. Table 2 contains the historical groundwater elevation data for the site.

Proposed Well Construction Details

<u>Monitoring Well MW-9E</u>

Apex proposes to install monitoring well MW-9E to a total depth of approximately 150-feet bgs using a hollow stem auger drilling rig. This will be a nested location using the current well MW-9D, which is installed to a total depth of 115 feet bgs. A conductor casing will be installed from 0- to 130-feet bgs, prior to advancing the hollow stem augers to total depth. Soil samples will be collected at five-foot intervals, starting at 115-feet bgs (the total depth of existing well MW-9D) and continuing to the total depth of the boring. The actual depth of the boring may vary according to the site lithology encountered at the time of installation. Soil lithology and visual and olfactory observations will be recorded in the field and logged according to the unified soil classification system (USCS), under the supervision of a State of California registered professional geologist. In addition, all soil samples will be field screened with a photoionization detector (PID).

Once total depth is reached, the well will be constructed using 2-inch diameter schedule 40 PVC well casing. The bottom 20-feet of the well will be constructed of 0.020-inch slotted PVC screen (consistent with other E zone wells).

Once the well casing is installed, the borehole will be backfilled with #3 Monterey Sand to two-feet above the screened interval, followed by a two-foot bentonite seal and Portland cement to the surface. The well will be completed with a flush-mounted traffic-rated vault box and a locking expansion cap.

The well will be allowed to set for a minimum of 48-hours prior to conducting well development activities. All fieldwork will be conducted in accordance with the Apex Standard Operating Procedures (SOP) included as Appendix B.

Nested Monitoring Wells MW-7E/F and MW-8E/F

Apex proposes to install two sets of nested, monitoring wells to be screened in the E- and F-zones at the locations indicated on Figure 3. The nested well borings will be advanced to a total depth of 175-feet bgs, using a hollow stem auger drilling rig. Soil samples will be collected at five-foot intervals, starting at 45-feet bgs (the total depth of existing well MW-8S) and continuing to the total depth of the boring. The total depth of the E-zone wells will be 150-feet bgs and the total depth of the F-zone wells will be 175-feet bgs. The actual depth of the borings may vary according to the site lithology encountered at the time of installation. Soil lithology and visual and olfactory observations will be recorded in the field and logged according to the USCS, under the supervision of a State of California registered professional geologist. In addition, all soil samples will be field screened with a PID.

Once total depth is reached, the wells will be constructed using 2-inch diameter schedule 40 PVC well casing. The bottom 20-feet of the F-zone well will be constructed of 0.020-inch slotted PVC screen. Once the F-zone casing is installed, the borehole will be backfilled with #3 Monterey sand to two-feet above the deeper screened interval, followed by a three-foot bentonite seal. Once the bentonite seal is allowed to set, the E-zone well casing will be installed. The bottom 20-feet of the E-zone well will be constructed of 0.020-inch slotted PVC screen. The wells will be completed with flush-mounted traffic-rated vault boxes and locking expansion caps.

The nested well will be allowed to set for a minimum of 48-hours prior to conducting well development activities. All fieldwork will be conducted in accordance with the Apex SOP included as Appendix B.

GROUNDWATER MONITORNG WELL DEEPENING

Monitoring well MW-1S has continued to be dry during every quarterly monitoring event since August of 2003. Groundwater levels at the site have significantly dropped over the past several years. Well MW-1S is an important monitoring point, but it is currently a data gap for the investigation and for the remediation of the site.

Apex proposes that well MW-1S be overdrilled and reconstructed to a depth of 65-feet bgs. The new well will be constructed with 4-inch diameter PVC well casing with 0.020-inch diameter slotted screen from 15-feet to total depth. Once the well casing and screen are installed, the borehole will be backfilled with #3 Monterey sand to two feet above the screened interval, followed by two feet of hydrated bentonite and Portland cement to the surface. The well will be completed with a flush-mounted traffic-rated vault box and a locking expansion cap.

PROPOSED INTERIM REMEDIAL ACTION

Batch Groundwater Extraction Aquifer Pumping Test

To assess if control the potential offsite migration of petroleum hydrocarbons in groundwater at the site is feasible, Apex proposes to conduct a 14-day batch groundwater extraction aquifer pumping test. The test will be conducted on monitoring well MW-4S and the radius of influence will be measured in wells MW-1S through MW-3S and MW-9D (Figure 2).

Groundwater will be extracted from monitoring well MW-4S using a submersible pump that will be operated by a control box. Apex will first conduct a pretest to determine the flow rate achievable from well MW-4S. To measure the radius of influence created by extracting groundwater from well MW-4S, Apex will install pressure transducers in wells MW-1S through MW-3S and MW-9D. The pressure transducers will contain data loggers that will record the test data until it can be downloaded at the end of the test. The submersible pump and pressure transducers will be installed in the test well and observation wells at least two hours before the test begins to insure that the depth-to-groundwater in each of the wells has sufficiently equilibrated. One additional pressure transducer will be installed in well MW-1S above the water table and will be used to correct for changes in barometric pressure.

Once the extraction pump and data loggers have been allowed to sit for a minimum of two hours, Apex personnel will collect manual depth-to-groundwater measurements from the test well and observation wells. Once the initial data is recorded, Apex personnel will start the test. A groundwater sample will be collected from the extraction pump line within an hour of starting the test. Additional groundwater samples will be collected every other day from the extraction pump line until the test is complete. Depth-to-groundwater levels in the extraction well will be recorded hourly between the hours of 8am and 8pm daily, for the duration of the test.

Extracted groundwater will be temporarily contained in a storage tank prior to treatment. Apex personnel will construct a temporary treatment system for the extracted groundwater that will consist of a holding tank, followed by a tray aeration volatile compound stripper and liquid-phase granular activated carbon filters. The off-gas created by the air stripper will be directed through the existing SVE system thermal oxidizer for destruction. Once the water is treated on-site, it will be discharged to the City of Sebastopol sanitary sewer system, under permit.

Once the test is complete, Apex personnel will remove the submersible pump from well MW-4S and the pressure transducers from Wells MW-1S through MW-3S and MW-9D and the temporary treatment system will be dismantled. The information contained in the data loggers of the pressure transducers will be downloaded and tabulated.

Permanent Groundwater Treatment System Equipment Location

In anticipation of future groundwater extraction and treatment, Apex, with assistance from Dave Zedrick, has attempted to locate an area on-site that could facilitate a permanent groundwater extraction and treatment system. The current location of the AS/SVE system would be ideal, however, the AS/ SVE system is operating efficiently and productively and no additional room is available. Apex has evaluated the design of the site building to determine if the roof could support the weight of an extraction and treatment system; which it cannot. Apex is currently looking into the possibility of leasing space from the neighboring restaurant.

Conclusion

Upon completion of the pumping test, Apex will prepare a results report that recommend groundwater pumping and treatment. The report will detail remediation system specifications to extract and treat contaminated groundwater at the site.

ATTACHMENTS:

Figure 1: Site Vicinity Map
Figure 2: Site Plan Map
Figure 3: Proposed Monitoring Well Location Map

Table 1: Well Construction Details
Table 2: Historical Groundwater Elevation Data

Appendix A: SCHED Letter, Dated January 24, 2006
Appendix B: Apex Standard Operating Procedures

REPORT DISTRIBUTION

Apex submitted this report, in its final form, to the following:

Regulatory Oversight:

Mr. Cliff Ives
Sonoma County Department of Health Services
Environmental Health Division
475 Aviation Boulevard, Suite 220
Santa Rosa, California 95403
(707) 565-6565

Mr. Luis Rivera
North Coast Regional Water Quality Control Board
5550 Skylane Blvd., Suite A
Santa Rosa, California 95403
(707) 576-2220

Mr. Robert Cave
Bay Area Air Quality Management District
939 Ellis Street
San Francisco, California 94109
(415) 771-6000

Responsible Party: Mr. Dave Zedrick

Property Owner: Mr. Tom Robinson

Mr. Ron Michelson

REMARKS/SIGNATURES

The information contained in this report reflects our professional opinions and was developed in accordance with currently available information, and accepted hydrogeologic and engineering practices.

The work described in the above report was performed under the direct supervision of a professional geologist, registered with the State of California, whose signature appears below.

We appreciate the opportunity to provide Rotten Robbie with geologic, engineering, and environmental consulting services, and trust this report meets your needs. If you have any questions or comments, please call us at (916) 851-0174.

Sincerely,

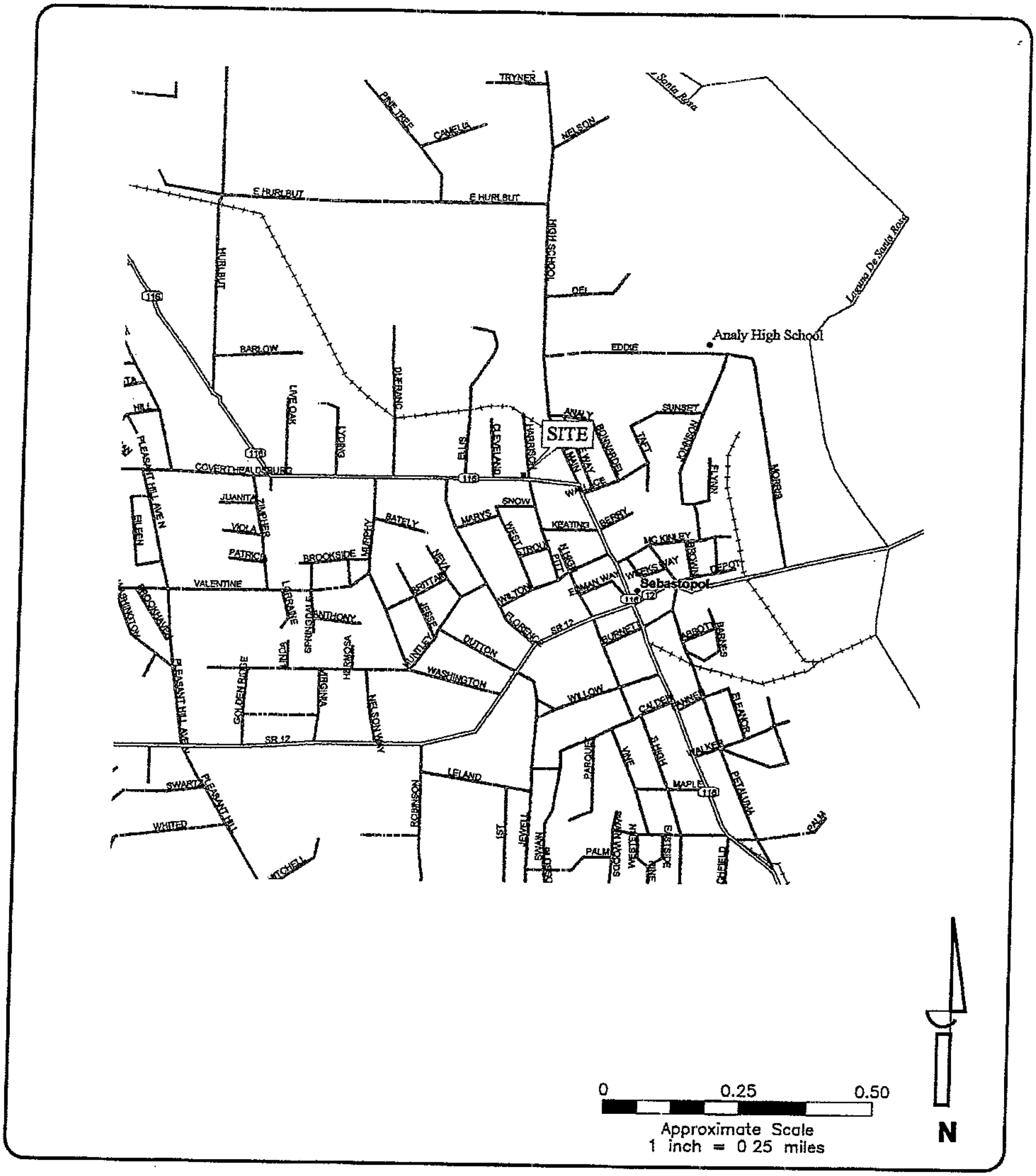
APEX ENVIROTECH, INC.

Kasey L. Jones
Senior Project Manager

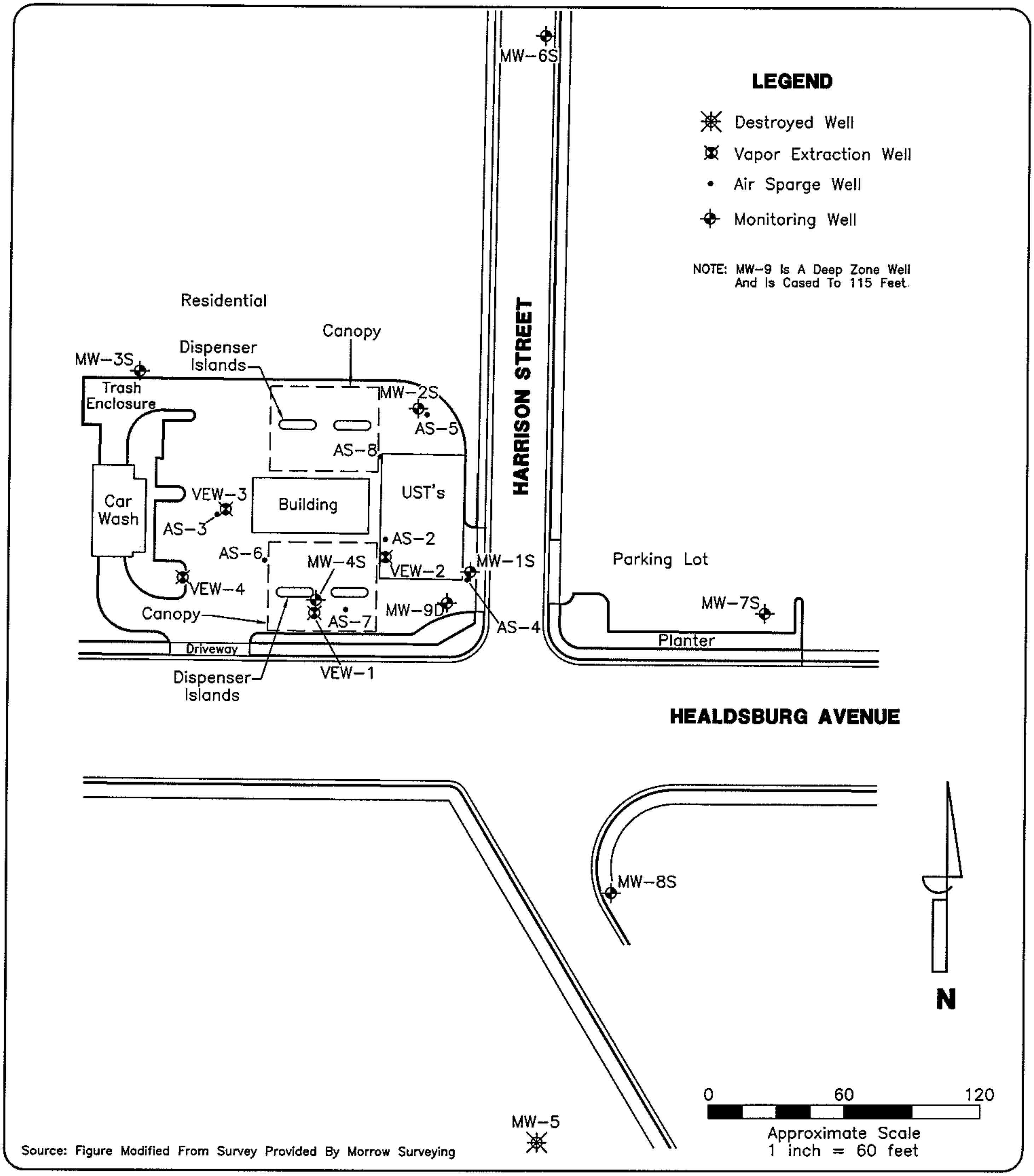
Michael S. Sgourakis, R.G.
Senior Geologist
CRG No. 7194

REGISTERED GEOLOGIST
MICHAEL S. SGOURAKIS
No 7194
STATE OF CALIFORNIA

FIGURES



APEX ENVIROTECH, INC	DRAWN BY: D. Alston DATE: 01/24/01 REVISIONS	**SITE VICINITY MAP**	FIGURE **1**
		Pit Stop 7200 Healdsburg Avenue Sebastopol, California	PROJECT NUMBER: ERA02.005



APEX ENVIROTECH, INC.

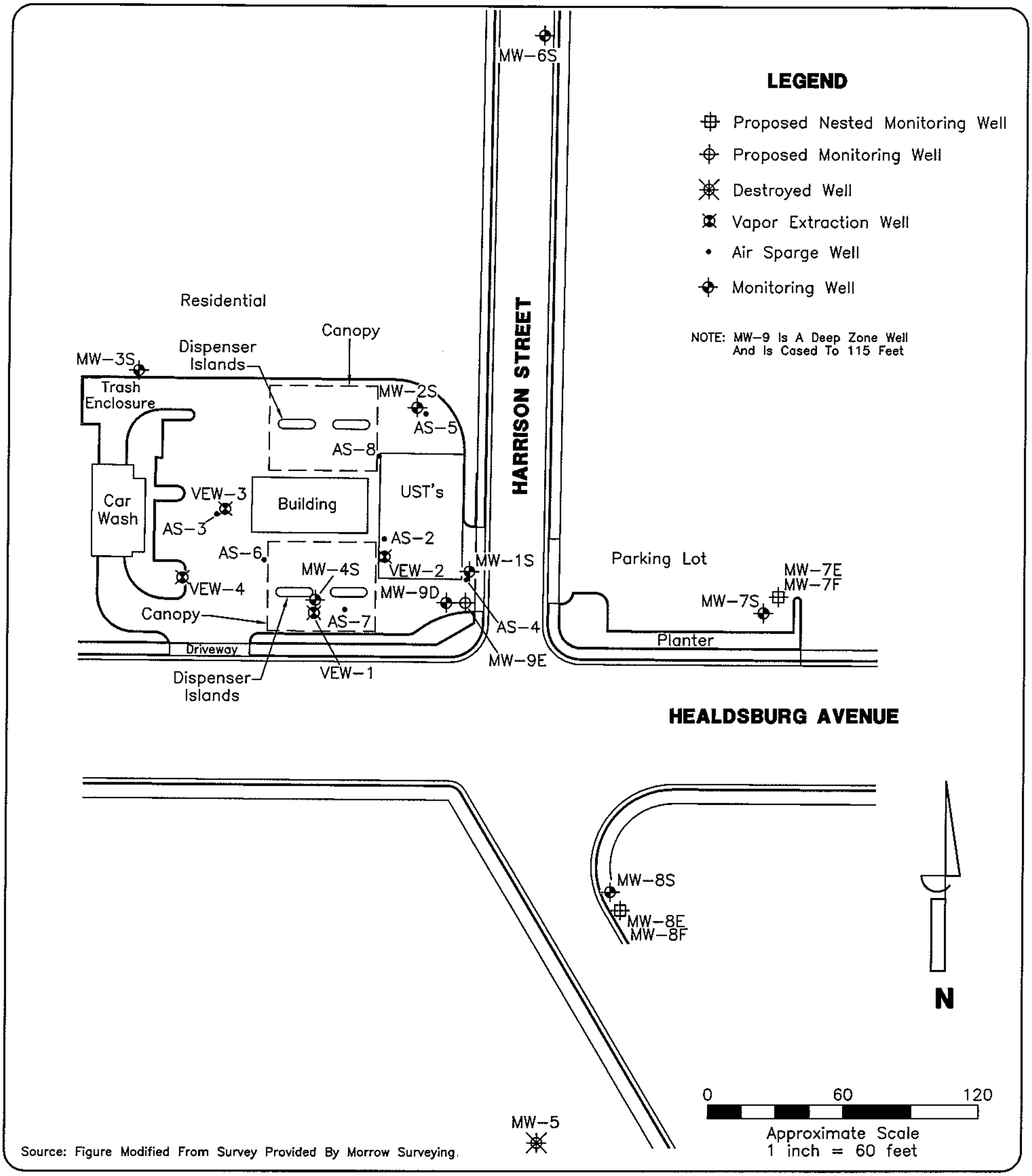
DRAWN BY:	J. Curry
DATE:	2/22/06
REVISIONS	

SITE PLAN MAP

Dave's Pit Stop
7200 Healdsburg Avenue
Sebastopol, California

FIGURE **2**

PROJECT NUMBER: ERA02.005



Source: Figure Modified From Survey Provided By Morrow Surveying.

APEX ENVIROTECH, INC

DRAWN BY: J. Curry
DATE: 3/10/06
REVISIONS

PROPOSED MONITORING WELL LOCATION MAP

Dave's Pit Stop
7200 Healdsburg Avenue
Sebastopol, California

FIGURE 3

PROJECT NUMBER: ERA02.005

TABLES

TABLE 1
WELL CONSTRUCTION DETAILS
Rotten Robbie
7200 Healdsburg Avenue
Sebastopol, California

Well Number	Well Installation Date	*Elevation TOC (feet)	Casing Material	Total Depth (feet)	Well Depth (feet)	Casing Diameter (inches)	Screened Interval (feet)	Filter Pack Interval (feet)
Shallow Wells								
MW-1S	Enlarged May-00	100 83	PVC	46	45	4	15 - 46	13 - 45
MW-2S	Enlarged May-00	102 35	PVC	49	48	4	15 - 49	13 - 48
MW-3S	Nov-88	103.21	PVC	48	47	2	15 - 47	13 - 48
MW-4S	Enlarged Sept-96	101.76	PVC	46.5	45.5	4	16.5- 46.5	14 - 46.5
MW-5S	February 2004	Destroyed						
MW-6S	2nd Qtr 1988	117.18	PVC	63	62	2	37 - 62	35 - 63
MW-7S	3/29/1990	99.71	PVC	45	43.5	2	23.5 - 43.5	21 - 45
MW-8S	5/17/2000	97.62	PVC	50	49	2	24 - 49	22 - 50
Deep Well								
MW-9D	5/15/2000	100 55	PVC	115	115	2	82 - 115	80 - 115
Vapor Extraction Wells								
VEW-1	2nd qtr 1998	---	PVC	---	---	4	---	---
VEW-2	2nd qtr 1998	---	PVC	---	---	4	---	---
VEW-3	2nd qtr 1998	---	PVC	---	---	4	---	---
VEW-4	2nd qtr 1998	---	PVC	---	---	4	---	---
Air Sparge Wells								
AS-2	5/16/2000	---	PVC	40	39	1	N/A	35 - 40
AS-2	5/16/2000	---	PVC	50	49	1	N/A	45 - 50
AS-3	5/16/2000	---	PVC	40	39	1	N/A	35 - 40
AS-3	5/16/2000	---	PVC	50	49	1	N/A	45 - 50
AS-4	5/16/2000	---	PVC	40	39	1	N/A	35 - 40
AS-4	5/16/2000	---	PVC	50	49	1	N/A	45 - 50
AS-5	5/16/2000	---	PVC	40	39	1	N/A	35 - 40
AS-5	5/16/2000	---	PVC	50	49	1	N/A	45 - 50
AS-6	12/19/2003	---	PVC	51	50	1	N/A	47.5 - 51
AS-7	12/19/2003	---	PVC	51	50	1	N/A	47.5 - 51
AS-8	12/19/2003	---	PVC	51	50	1	N/A	47.5 - 51

Notes:
* = surveyed by Morrow Surveying to mean sea level 10/01
--- = Information not found
TOC = Top of Casing
PVC = Polyvinyl Chloride

TABLE 2
HISTORICAL GROUNDWATER ELEVATION DATA
Rotten Robbie
7200 Healdsburg Avenue
Sebastopol, California
(All measurements are in feet)

Monitoring Well	Date	Reference Elevation (top of casing)	Depth to Groundwater (Feet)	Depth to FLH (Feet)	Groundwater Elevation (Feet)	FLH Thickness (Feet)	Groundwater Flow Direction
Shallow Wells							
MW-1	8/9/94	98.04	37.86		60.18		
	11/22/94		39.10		58.94		
	2/22/95		37.57		60.47		
	5/18/95		34.91		63.13		
	8/9/95		34.62		63.42		
	11/9/95		36.27		61.77		
	3/7/96		35.57		62.47		
	5/16/96		33.20		64.84		
	8/30/96		34.69		63.35		
	11/19/96		35.83		62.21		
	2/21/97		34.71		63.33		
	5/27/97		34.00		64.04		
	8/7/97		35.18		62.86		
	11/21/97		36.78		61.26		
	2/24/98		34.70		63.34		
	5/26/98		32.11		65.93		
	8/26/98		32.19		65.85		
	11/8/98		33.25		64.79		
	2/11/99		33.10		64.94		
	5/5/99		30.68		67.36		
	5/31/00		32.49		65.55		
	10/20/00		34.89		63.15		SE
	1/31/01		36.15		61.89		SE
	4/18/01		35.62		62.42		NE
	7/30/01		36.50		61.54		NE
	12/19/01	100.83	38.41		62.42		SW
	2/13/02		37.40		63.43		SE
	4/13/02		38.40		62.43		SE
	7/10/02		38.10		62.73		SE
	10/29/02		39.53		61.30		E
	1/15/03		40.03		60.80		SE
	4/9/03		39.05		61.78		E
	8/13/03		DRY		DRY		E
	11/5/03		DRY		DRY		E
	2/18/04		DRY		DRY		SE
	6/16/04		DRY		DRY		S
	9/8/04		DRY		DRY		E
	12/21/04		DRY		DRY		E
	2/15/05		34.12		66.71		E
	6/20/05		33.56		67.27		Regionally East
	9/26/05		34.81		66.02		E
	12/19/05		DRY		DRY		E

TABLE 2
HISTORICAL GROUNDWATER ELEVATION DATA
Rotten Robbie
7200 Healdsburg Avenue
Sebastopol, California
(All measurements are in feet)

Monitoring Well	Date	Reference Elevation (top of casing)	Depth to Groundwater (Feet)	Depth to FLH (Feet)	Groundwater Elevation (Feet)	FLH Thickness (Feet)	Groundwater Flow Direction
MW-2	8/9/94	99.74	39.28		60.46		
	11/22/94		40.53		59.21		
	2/22/95		38.95		60.79		
	5/18/95		36.30		63.44		
	8/9/95		36.06		63.68		
	11/9/95		37.73		62.01		
	3/7/96		36.97		62.77		
	5/16/96		35.35		64.39		
	8/30/96		36.15		63.59		
	11/19/96		37.31		62.43		
	2/21/97		36.16		63.58		
	5/27/97		35.48		64.26		
	8/7/97		36.65		63.09		
	11/21/97		38.33		61.41		
	2/24/98		36.14		63.60		
	5/26/98		33.58		66.16		
	8/26/98		33.69		66.05		
	11/8/98		34.60		65.14		
	2/11/99		34.58		65.16		
	5/5/99		32.07		67.67		
	5/31/00		33.84		65.90		
	10/20/00		36.27		63.47		SE
	1/31/01		37.57		62.17		SE
	4/18/01		36.95		62.79		NE
	7/30/01		38.14		61.60		NE
	12/19/01	102.35	39.75		62.60		SW
	2/13/02		38.70		63.65		SE
	4/13/02		38.72		63.63		SE
	7/10/02		39.44		62.91		SE
	10/29/02		41.18		61.17		E
	1/15/03		41.79		60.56		SE
	4/9/03		41.25		61.10		E
	8/13/03		41.41		60.94		E
	11/5/03		42.24		60.11		E
	2/18/04		42.14		60.21		SE
	6/16/04		43.49		58.86		S
	9/8/04		44.28		58.07		E
	12/21/04		45.02		57.33		E
	2/15/05		45.19		57.16		E
	6/20/05		43.24		59.11		Regionally East
	9/26/05		43.99		58.36		E
	12/19/05		45.65		56.70		E

TABLE 2
HISTORICAL GROUNDWATER ELEVATION DATA
Rotten Robbie
7200 Healdsburg Avenue
Sebastopol, California
(All measurements are in feet)

Monitoring Well	Date	Reference Elevation (top of casing)	Depth to Groundwater (Feet)	Depth to FLH (Feet)	Groundwater Elevation (Feet)	FLH Thickness (Feet)	Groundwater Flow Direction
MW-3	8/9/94	103.21	18.78		84.43		
	11/22/94		19.99		83.22		
	2/22/95		17.60		85.61		
	5/18/95		13.39		89.82		
	8/9/95		12.51		90.70		
	11/9/95		14.50		88.71		
	3/7/96		13.88		89.33		
	5/16/96		12.10		91.11		
	8/30/96		13.28		89.93		
	11/19/96		14.66		88.55		
	2/21/97		13.65		89.56		
	5/27/97		11.93		91.28		
	8/7/97		13.32		89.89		
	11/21/97		15.48		87.73		
	2/24/98		10.14		93.07		
	5/26/98		8.05		95.16		
	8/26/98		9.56		93.65		
	11/8/98		11.33		91.88		
	2/11/99		10.71		92.50		
	5/5/99		8.30		94.91		
	5/31/00		9.21		94.00		
	10/20/00		12.22		90.99		SE
	1/31/01		12.91		90.30		SE
	4/18/01		11.70		91.51		NE
	7/30/01		14.03		89.18		NE
	12/19/01	103.21	16.05		87.16		SW
	2/13/02		13.30		89.91		SE
	4/13/02		16.10		87.11		SE
	7/10/02		13.01		90.20		SE
	10/29/02		15.82		87.39		E
	1/15/03		14.89		88.32		SE
	4/9/03		14.52		88.69		E
	8/13/03		15.27		87.94		E
	11/5/03		15.63		87.58		E
	2/18/04		11.97		91.24		SE
	6/16/04		9.97		93.24		S
	9/8/04		11.02		92.19		E
	12/21/04		12.47		90.74		E
	2/15/05		11.41		91.80		E
	6/20/05		8.80		94.41		Regionally East
	9/26/05		9.66		93.55		E
	12/19/05		9.96		93.25		E

TABLE 2
HISTORICAL GROUNDWATER ELEVATION DATA
Rotten Robbie
7200 Healdsburg Avenue
Sebastopol, California
(All measurements are in feet)

Monitoring Well	Date	Reference Elevation (top of casing)	Depth to Groundwater (Feet)	Depth to FLH (Feet)	Groundwater Elevation (Feet)	FLH Thickness (Feet)	Groundwater Flow Direction
MW-4*	8/9/94	98 89	38 57	38.04	60.72	0.53	
	11/22/94		40 00	39.32	59 40	0.68	
	2/25/95		41.07	37.58	60 44	3.49	
	5/18/95		36.29	35 29	63 35	1.00	
	8/9/95		36.58	34 44	63.92	2.14	
	11/9/95		37 06	36 34	62.37	0.72	
	3/7/96		36 90	35 99	62.67	0 91	
	5/16/96		35 92	35.17	63 53	0 75	
	8/30/96		35 65	34.77	63.90	0.88	
	11/19/96	98.99	35.95	NA	63 04	sheen (<0.01)	
	2/21/97		35.48	NA	63 51	0.08	
	5/27/97		34.80	34 49	64 19	0.31	
	8/7/97		35.52	35 49	63.47	0.01	
	11/21/97		37.33	NA	61.66	0.00	
	2/24/98		35 72	NA	63.27	sheen (<0 01)	
	5/26/98		32 48	NA	66.51	sheen (<0.01)	
	8/26/98		32 48	NA	66 51	sheen (<0.01)	
	11/8/98		33.90	36.70	65.09	2 80	
	2/11/99		33 97	33.94	65.02	0 03	
	5/5/99		31.04	33.94	67.95	0.03	
	5/31/00		NM	NM	NM	0.07	
	10/20/00		NM	NM	NM	NM	SE
	1/31/01		38.03	37.33	60.96	0.70	SE
	4/18/01		NM	NM	NM	NM	NE
	7/30/01		NM	NM	NM	NM	NE
	12/19/01	101 76	NM	NM	NM	0.25	SW
	2/13/02		NM	NM	NM	0 25	SE
	4/13/02		NM	NM	NM	0.25	SE
	7/10/02		38 38	38 28	63.45	0.10	SE
	10/29/02		41.25	39.58	61.74	1 67	E
	1/15/03		41.99	40.43	60 92	1.56	SE
	4/9/03		39.50	0.00	62 26	0.00	E
	8/13/03		40 69	0.00	61 07	0.00	E
	11/5/03		41 21	41.09	60.64	0.12	E
	2/18/04		40 25	NM	61.51	0.00	SE
	6/16/04		40 41		61.35	0.00	S
	9/8/04		41.15	NM	60.61	0.00	E
	12/21/04		42.77	NM	58.99	0 00	E
	2/15/05		42.78	NM	58.98	0.00	E
	6/20/05		40.31	NM	61.45	0 00	Regionally East
	9/26/05		37.55	NM	64 21	0 00	E
	12/19/05		43.46	NM	58.30	0 00	E

TABLE 2
HISTORICAL GROUNDWATER ELEVATION DATA
Rotten Robbie
7200 Healdsburg Avenue
Sebastopol, California
(All measurements are in feet)

Monitoring Well	Date	Reference Elevation (top of casing)	Depth to Groundwater (Feet)	Depth to FLH (Feet)	Groundwater Elevation (Feet)	FLH Thickness (Feet)	Groundwater Flow Direction
MW-5	8/9/94	NM	38.97		---		
	11/22/94		40.23		---		
	2/22/95		39 09		---		
	5/18/95		36.34		---		
	8/9/95		35.62		---		
	11/9/95		37.20		---		
	3/7/96		36.90		---		
	5/16/96		NM		---		
	8/30/96		35.76		---		
	11/19/96		36.71		---		
	2/21/97		NM		---		
	5/27/97		35.00		---		
	8/7/97		36.19		---		
	11/21/97		NM		---		
	2/24/98		NM		---		
	5/26/98		33.08		---		
	8/26/98		33.06		---		
	11/8/98		34 23		---		
	2/11/99		42.98		---		
	5/5/99		31.55		---		
	5/31/00		NM		---		
	10/20/00		NM		---		SE
	1/31/01		NM		---		SE
	4/18/01		NM		---		NE
	7/30/01		NM		---		NE
	10/29/02	102 50	40 25		62 25		E
	1/15/03		41.21		61 29		SE
	4/9/03		40.26		62.24		E
	8/13/03		40.98		61.52		E
	11/5/03		41 86		60.64		E
	2/18/04	destroyed					SE

TABLE 2
HISTORICAL GROUNDWATER ELEVATION DATA
Rotten Robbie
7200 Healdsburg Avenue
Sebastopol, California
(All measurements are in feet)

Monitoring Well	Date	Reference Elevation (top of casing)	Depth to Groundwater (Feet)	Depth to FLH (Feet)	Groundwater Elevation (Feet)	FLH Thickness (Feet)	Groundwater Flow Direction
MW-6	8/9/94	NM	53.93		---		
	11/22/94		55 21		---		
	2/22/95		53 85		---		
	5/18/95		50.99		---		
	8/9/95		50.78		---		
	11/9/95		52.38		---		
	3/7/96		51.78		---		
	5/16/96		NM		---		
	8/30/96		50.84		---		
	11/19/96		NM		---		
	2/21/97		NM		---		
	5/27/97		50.15		---		
	8/7/97		51.32		---		
	11/21/97		NM		---		
	2/24/98		NM		---		
	5/26/98		48.30		---		
	8/26/98		48.38		---		
	11/8/98		49 38		---		
	2/11/99		49.24		---		
	5/5/99		46.86		---		
	5/31/00		48 73		---		
	10/20/00		51 15		---		SE
	1/31/01		52.42		---		SE
	4/18/01		51.90		---		NE
	7/30/01		53.10		---		NE
	12/19/01	117.18	54 84		62.34		SW
	2/13/02		53.80		63 38		SE
	4/13/02		54.15		63 03		SE
	7/10/02		54.36		62.82		SE
	10/29/02		55 97		61.21		E
	1/15/03		56 67		60.51		SE
	4/9/03		55.57		61 61		E
	8/13/03		56.39		60 79		E
	11/5/03		57.35		59.83		E
	2/18/04		57 56		59.62		SE
	6/16/04		57.01		60.17		S
	9/8/04		58.23		58 95		E
	12/21/04		59 52		57 66		E
	2/15/05		49 72		67.46		E
	6/20/05		58.09		59.09		Regionally East
	9/26/05		---		---		E
	12/19/05		60 26		56.92		E

TABLE 2
HISTORICAL GROUNDWATER ELEVATION DATA
Rotten Robbie
7200 Healdsburg Avenue
Sebastopol, California
(All measurements are in feet)

Monitoring Well	Date	Reference Elevation (top of casing)	Depth to Groundwater (Feet)	Depth to FLH (Feet)	Groundwater Elevation (Feet)	FLH Thickness (Feet)	Groundwater Flow Direction
MW-7	8/9/94	97 17	37 32		59.85		
	11/22/94		38.62		58.55		
	2/22/95		NM		NM		
	5/18/95		34.58		62.59		
	8/9/95		34 20		62 97		
	11/9/95		35.85		61.32		
	3/7/96		35.29		61.88		
	5/16/96		33 54		63.63		
	8/30/96		34 23		62 94		
	11/19/96		35.37		61.80		
	2/21/97		34.44		62.73		
	5/27/97		33 58		63 59		
	8/7/97		34.76		62 41		
	11/21/97		36.44		60.73		
	2/24/98		34.82		62.35		
	5/26/98		31.80		65 37		
	8/26/98		31 76		65 41		
	11/8/98		32.82		64.35		
	2/11/99		32.57		64.60		
	5/5/99		30.28		66.89		
	5/31/00		32 13		65.04		
	10/20/00		34 59		62 58		SE
	1/31/01		35.79		61.38		SE
	4/18/01		NM		---		NE
	7/30/01		36.41		60.76		NE
	12/19/01	99.71	38 13		61.58		SW
	2/13/02		37.25		62 46		SE
	4/13/02		38.02		61.69		SE
	7/10/02		37 75		61.96		SE
	10/29/02		39.31		60 40		E
	1/15/03		40.07		59 64		SE
	4/9/03		39 03		60.68		E
	8/13/03		39 75		59.96		E
	11/5/03		40.65		59 06		E
	2/18/04		40.99		58.72		SE
	6/16/04		40.49		59.22		S
	9/8/04		41 65		58.06		E
	12/21/04		43 04		56 67		E
	2/15/05		43.16		56 55		E
	6/20/05		41.59		58.12		Regionally East
	9/26/05		42.79		56.92		E
	12/19/05		43 79		55.92		E

TABLE 2
HISTORICAL GROUNDWATER ELEVATION DATA
Rotten Robbie
7200 Healdsburg Avenue
Sebastopol, California
(All measurements are in feet)

Monitoring Well	Date	Reference Elevation (top of casing)	Depth to Groundwater (Feet)	Depth to FLH (Feet)	Groundwater Elevation (Feet)	FLH Thickness (Feet)	Groundwater Flow Direction
MW-8	5/31/00	NM	29.88		---		
	10/20/00		32.38		---		SE
	1/31/01		33.59		---		SE
	4/18/01		32.46		---		NE
	7/30/01		34.18		---		NE
	12/19/01	97.62	36.84		60.78		SW
	2/13/02		36.00		61.62		SE
	4/13/02		36.53		61.09		SE
	7/10/02		35.58		62.04		SE
	10/29/02		37.10		60.52		E
	1/15/03		37.80		59.82		SE
	4/9/03		36.87		60.75		E
	8/13/03		37.64		59.98		E
	11/5/03		38.55		59.07		E
	2/18/04		38.72		58.90		SE
	6/16/04		38.29		59.33		S
	9/8/04		39.40		58.22		E
	12/21/04		40.81		56.81		E
	2/15/05		40.86		56.76		E
	6/20/05		39.24		58.38		Regionally East
	9/26/05		40.49		57.13		E
	12/19/05		41.54		56.08		E
Deep Well							
MW-9	5/31/00	NM	32.22		---		
	10/20/00		34.72		---		SE
	1/31/01		35.90		---		SE
	4/18/01		35.62		---		NE
	7/30/01		36.48		---		NE
	12/19/01	100.55	37.63		62.92		SW
	2/13/02		37.20		63.35		SE
	4/13/02		37.20		63.35		SE
	7/10/02		37.89		62.66		SE
	10/29/02		39.47		61.08		E
	1/15/03		40.12		60.43		SE
	4/9/03		39.07		61.48		E
	8/13/03		39.92		60.63		E
	11/5/03		40.82		59.73		E
	2/18/04		40.86		59.69		SE
	6/16/04		40.69		59.86		S
	9/8/04		41.74		58.81		E
	12/21/04		43.11		57.44		E
	2/15/05		43.16		57.39		E
	6/20/05		41.53		59.02		Regionally East
	9/26/05		42.61		57.94		E
	12/19/05		43.88		56.67		E

NOTES:
NA -Not applicable
NM -Not measured
-Surveyed by Morrow Surveying to mean sea level 10/01.
Historical Measurements are present in the Apex "Corrective Action Plan" dated October 14, 1994.
* -Groundwater elevation was corrected for free product using TPHg denisity of 0.739

APPENDIX A

SCEHD LETTER,
DATED JANUARY 24, 2006

COUNTY of SONOMA
DEPARTMENT OF HEALTH SERVICES

Rita Scardaci, MPH – Director
Sharon Aguilera – Assistant Director

Environmental Health Division
Walter L Kruse - Director

Certified Mail — Return Receipt Requested

PO# ERA02.005
PM: RJ

RECEIVED
JAN 30 2006

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January 24, 2006

Mr. Dave Zedrick
P.O. Box 7010
Santa Rosa, CA 95407

Mr. Tom Robinson
Robinson Oil Corporation
4250 Williams Road
San Jose, CA 95129

Re: Dave's Pit Stop #2 (former), 7200 Healdsburg Avenue, Sebastopol, CA 95472
Leaking Underground Storage Tank Site
SCDHS-EHD #00001569, NCRWQCB #1TSO244, CU FUND #000726

Gentlemen:

This Department is in the process of reviewing sites that are not in compliance with previous directives. The referenced site fits this category. Our files show that on March 24, 2005, Mr. Zedrick was sent a directive to submit a workplan and revised Corrective Action Plan to remediate groundwater more aggressively. This was required because the currently operating Soil Vapor Extraction and Air Sparging systems do not appear adequate to remediate or control the groundwater contaminant plumes. Groundwater extraction was recommended by Mr. Zedrick's consultant Apex Environmental, Inc. (Apex)

A due date for the submittal of the workplan and revised Corrective Action Plan was established at May 24, 2005. This date was extended to June 30, 2005 at Apex's May 24, 2005 request. As of this writing, this Department has not received the overdue documents. Site requirements are modified in the following paragraph, however, because of increasing levels of reported contamination.

A review of the *Third Quarter 2005 Groundwater Monitoring and Remediation Status Report* (Apex, December 9, 2005) shows apparently increasing trends of benzene, MTBE, TAME and TBA in deep monitoring well MW-9. **Further groundwater plume definition is now additionally required** to determine the extent of the contaminant plumes at depth both vertically and horizontally. An *interim remedial action* workplan is concurrently required for groundwater plume control and treatment. The requirement for a final revised Corrective Action Plan with evaluation of remedial cost-effectiveness is now suspended since the site requires further characterization and the remedial action proposed may be insufficient. A final revised Corrective Action Plan will be required when the groundwater plume is fully defined.

This Department will proceed with enforcement action if the remedial action workplan for hydraulic control and groundwater treatment, and for further groundwater plume definition, is not received by **February 24, 2006**. Workplans and reports must be completed by qualified consultants Failure to submit reports as required is a violation of the California Health and Safety Code Sections 25296.10 and 25299.76. No further due date extensions will be granted for the site without adequate justification.

If the site is not brought into compliance, this Department will be left with no alternative but to refer the site to the appropriate State Regional Water Quality Control Board or the District Attorney with a request for enforcement action. An Enforcement Appendix regarding penalties is enclosed. Note also that State cleanup funds will not be available to sites that are out of compliance with regulatory directives.

Please contact this Department in writing or at (707) 565-6574 if you have any questions regarding the site requirements.

Sincerely,

Cliff Ins

Senior Environmental Health Specialist
Leaking Underground Storage Tank
Local Oversight Program

CI

Enclosures

c: Mr. Jeff Holtzman, Sonoma County Deputy District Attorney
Mr. Luis Rivera, NCRWQCB
Ms. Janice Goebel, NCRWQCB
Mr. David Charter, SWRCB Cleanup Fund
✓Mr. Michael S Sgourakis, Apex Envirotech, Inc
11244 Pyrites Way, Gold River, CA 95670
Mr Randy Collins, Healdsburg/Sebastopol Unified Program Agency
Ms. Susan Kelly, City of Sebastopol Engineering Department,
714 Johnson St., Sebastopol, CA 95472

APPENDIX B

APEX STANDARD OPERATING PROCEDURES

APEX ENVIROTECH, INC.

STANDARD OPERATING PROCEDURES

SOP-1
SOIL BORING SAMPLING

During drilling, soil samples for chemical analysis are collected in thin-walled brass tubes, of varying diameters and lengths (e.g , 4 or 6 inches long by 2 inches outside diameter). Three or four of the selected tubes, plus a spacer tube, are set in an 18-inch long split-barrel sampler of the appropriate inside-diameter.

Where possible, the split-barrel sampler is driven its entire length either hydraulically or using a 140-pound drop hammer. The sampler is extracted from the borehole and the brass tubes, containing the soil samples, are removed. Upon removal from the sampler, the selected brass tubes are either immediately trimmed and capped with aluminum foil or "Teflon" sheets and plastic caps or the samples are extruded from the tubes and sealed within other appropriate, cleaned sample containers. The samples are then hermetically sealed, labeled, and refrigerated for delivery, under strict chain-of-custody, to the analytical laboratory. These procedures minimize the potential for cross-contamination and volatilization of volatile organic compounds (VOC) prior to chemical analysis.

One soil sample collected at each sampling interval is analyzed in the field using either a portable photoionization detector (PID), flame ionization detector, organic vapor analyzer, catalytic gas detector, or an explosimeter. The purpose of this field analysis is to qualitatively determine the presence or absence of hydrocarbons, and the samples to be analyzed at the laboratory. The soil sample is sealed in either a brass tube, glass jar, or plastic bag to allow for some volatilization of VOC. The PID is then used to measure the concentrations of hydrocarbons within the containers's headspace. The data is recorded on both field notes and the boring logs at the depth corresponding to the sampling point.

Other soil samples are collected to document the soil and/or stratigraphic profile beneath the project site, and estimate the relative permeability of the subsurface materials. All drilling and sampling equipment are either steam cleaned or washed in solution and doubly rinsed in deionized water prior to use at each site and between boreholes to minimize the potential for cross-contamination

In the event the soil samples cannot be submitted to the analytical laboratory on the same day they are collected (e g., due to weekends or holidays), the samples are temporarily stored until the first opportunity for submittal either on ice in a cooler, such as when in the field, or in a refrigerator at Apex's office

SOP-2
SOIL EXCAVATION AND SAMPLING

Excavation and subsequent soil sampling is performed under the direction of a registered geologist or civil engineer. To reduce the potential for cross-contamination, all excavation equipment is either steam cleaned or washed prior to use and between excavations. Soil samples for chemical analysis are collected in cleaned, thin-walled brass tubes of varying diameters and lengths (e g., 6 inches long by 2 inches outside diameter) or other appropriate cleaned sample container. If used, one tube may be set in a 2-inch inside diameter, hand-driven sampler To reduce the potential for cross-contamination between samples, the sampler is washed in a solution and doubly rinsed between each sampling event.

Upon recovery, a portion of the soil sample is sealed for later screening with either a portable photoionization detector, flame ionization detector, or an explosimeter. Another portion of the sample is used for description of the excavated materials. A third portion of the sample is hermetically sealed, labeled and refrigerated for delivery, under strict chain-of-custody, to the analytical laboratory These procedures minimize the potential for cross-contamination and volatilization of volatile organic compounds prior to chemical analysis.

In the event the soil samples cannot be submitted to the analytical laboratory on the same day they are collected (e.g., due to weekends or holidays), the samples are temporarily stored until the first opportunity for submittal either on ice in a cooler, such as when in the field, or in a refrigerator at Apex's office

SOP-3
SOIL CLASSIFICATION

Soil samples are classified according to the Unified Soil Classification System. Representative portions of the samples may be submitted, under strict chain-of-custody, to an analytical laboratory for further examination and verification of the in-field classification and analysis of soil mechanical and/or petrophysical properties. The soil types are indicated on logs of either excavations or borings together with depths corresponding to the sampling points and other pertinent information.

SOP-4
SAMPLE IDENTIFICATION AND CHAIN-OF-CUSTODY PROCEDURES

Sample identification and chain-of-custody procedures ensure sample integrity as well as document sample possession from the time of collection to ultimate disposal. Each sample container submitted for analysis is labeled to identify the job number, date, time of sample collection, a sample number unique to the sample, any in-field measurements made, sampling methodology, name(s) of on-site personnel, and any other pertinent field observations also recorded on the field excavation or boring log.

Chain-of-custody forms are used to record possession of the sample from time of collection to arrival at the laboratory. During shipment, the person with custody of the samples will relinquish them to the next person by signing the chain-of-custody form(s) and noting the date and time. The sample-control officer at the laboratory will verify sample integrity, correct preservation, confirm collection in the proper container(s), and ensure adequate volume for analysis

If these conditions are met, the samples will be assigned unique laboratory log numbers for identification throughout analysis and reporting. The log numbers will be recorded on the chain-of-custody forms and in the legally-required log book maintained in the laboratory. The sample description, date received, client's name, and any other relevant information will also be recorded.

SOP-5
LABORATORY ANALYTICAL QUALITY ASSURANCE AND CONTROL

In addition to routine instrument calibration, replicates, spikes, blanks, spiked blanks, and certified reference materials are routinely analyzed at method-specific frequencies to monitor precision and bias. Additional components of the laboratory Quality Assurance/Quality Control program include:

1. Participation in state and federal laboratory accreditation/certification programs;

2. Participation in both U.S. EPA Performance Evaluation studies (WS and WP studies) and inter-laboratory performance evaluation programs;

3. Standard operating procedures describing routine and periodic instrument maintenance;

4. "Out-of-Control"/Corrective Action documentation procedures; and,

5. Multi-level review of raw data and client reports

SOP-6
HOLLOW-STEM AUGER MONITORING WELL INSTALLATION AND DEVELOPMENT

Boreholes for monitoring wells are drilled using a truck-mounted, hollow-stem auger drill rig. The borehole diameter will be a minimum of 4 inches larger than the outside diameter of the casing when installing well screen. The hollow-stem auger provides minimal interruption of drilling while permitting soil sampling at desired intervals. Soil samples are collected by either hammering (with a 140-pound drop hammer) or hydraulically pushing a conventional split-barrel sampler containing pre-cleaned 2-inch-diameter brass tubes. A geologist or engineer from Apex Envirotech, Inc., continuously logs each borehole during drilling and constantly checks drill cuttings for indications of both the first recognizable occurrence of groundwater and volatile hydrocarbons using either a portable photoionization detector, flame ionization detector, or an explosimeter. The sampler is rinsed between samples and either steam cleaned or washed with all other drilling equipment between borings to minimize the potential for cross-contamination.

Monitoring wells are cased with threaded, factory-perforated and blank Schedule 40 PVC. The perforated interval consists of slotted casing, generally with 0.020-inch wide by 1.5-inch long slots, with 42 slots per foot. A PVC cap may be secured to the bottom of the casing with stainless steel screws; no solvents or cements are used. Centering devices may be fastened to the casing to ensure even distribution of filter material and grout within the borehole annulus. The well casing is thoroughly washed and/or steam cleaned, or may be purchased as pre-cleaned, prior to installation.

After setting the casing inside the hollow-stem auger, sand or gravel filter material is poured into the annular space to fill from boring bottom to generally 1 foot above the perforated interval. A 1- to 2-foot thick bentonite plug is set above this filter material to prevent grout from infiltrating the filter pack. Either neat cement, containing about 5 percent bentonite, or sand-cement grout is then tremmied into the annular space from the top of the bentonite plug to near surface. A traffic-rated vault is installed around each wellhead for wells located in parking lots or driveways, while steel "stovepipes" are usually set over wellheads in landscaped areas

After installation, the wells are thoroughly developed to remove residual drilling materials from the wellbore, and to improve well performance by removing fine material from the filter pack that may pass into the well. Well development techniques used may include pumping, surging, bailing, swabbing, jetting, flushing, and air-lifting. All development water is collected either in drums or tanks for temporary storage, and properly disposed of depending on laboratory analytical results. To minimize the potential for cross-contamination between wells, all development equipment is either steam cleaned or properly washed prior to use. Following development, the well is allowed to stand undisturbed for a minimum of 24 hours before its first sampling.

SOP-7
GROUNDWATER PURGING AND SAMPLING

Prior to water sampling, each well is purged by evacuating a minimum of three wetted well-casing volumes of groundwater. When required, purging will continue until either the discharge water temperature, conductivity, or pH stabilize, a maximum of ten wetted-casing volumes of groundwater have been recovered, or the well is bailed dry. When practical, the groundwater sample should be collected when the water level in the well recovers to at least 80 percent of its static level

The sampling equipment consists of either a "Teflon" bailer, PVC bailer, or stainless steel bladder pump with a "Teflon" bladder. If the sampling system is dedicated to the well, then the bailer is usually "Teflon," but the bladder pump is PVC with a polypropylene bladder. In general and depending on the intended laboratory analysis, 40-milliliter glass, volatile organic analysis (VOA) vials, with "Teflon" septa, are used as sample containers.

The groundwater sample is decanted into each VOA vial in such a manner that there is no meniscus at the top of the vial. A cap is quickly secured to the top of the vial. The vial is then inverted and gently tapped to see if air bubbles are present. If none are present, the vial is labeled and refrigerated for delivery, under strict chain-of-custody, to the analytical laboratory. Label information should include a unique sample identification number, job identification number, date, time, type of analysis requested, and the sampler's name.

For quality control purposes, a duplicate water sample is collected from each well. This sample may also be analyzed or put on hold at the laboratory. When required, a trip blank prepared at the laboratory, is placed in the transport cooler. It is labeled similar to the well samples, remains in the cooler during transport, and is analyzed by the laboratory along with the groundwater samples. In addition, a field blank may be prepared in the field when sampling equipment is not dedicated. The field blank is prepared after a pump or bailer has been either steam cleaned or properly washed, prior to use in the next well, and is analyzed along with the other samples. The field blank analysis demonstrates the effectiveness of the in-field cleaning procedures to prevent cross-contamination.

To minimize the potential for cross-contamination between wells, all well development and water sampling equipment not dedicated to a well is either steam cleaned or properly washed between use. As a secondary precautionary measure, wells are sampled in order of least to highest concentrations as established by available previous analytical data

In the event the water samples cannot be submitted to the analytical laboratory on the same day they are collected (e.g., due to weekends or holidays), the samples are temporarily stored until the first opportunity for submittal either on water ice in a cooler, such as when in the field, or in refrigerator at Apex's office.

SOP-8
ROTARY DRILLING MONITORING WELL INSTALLATION AND DEVELOPMENT

Boreholes for monitoring wells may be drilled using truck-mounted drill rigs capable of air- and mud-rotary drilling, and continuous coring and/or drilling with tri-cone roller or fixed-blade drag bits. Generally, rotary drilling is used when more conventional hollow-stem auger drilling either is or becomes infeasible. Various drilling fluids (mud or air), used to keep the borehole from caving and to remove drill cuttings, are chosen according to the nature of the soils and/or geologic formations expected to be encountered as well as the monitoring program. Samples may be collected directly from cores. A geologist or engineer from Apex Envirotech, Inc., continuously logs each boring during drilling and checks returned drill cuttings for indications of both the first recognizable occurrence of groundwater and volatile hydrocarbons, using either a portable photoionization detector (PID), flame ionization detector, or explosimeter. All drilling equipment is either steam cleaned or washed between borings to minimize the potential for cross-contamination.

Frequently, hollow-stem augers are used to drill and sample to either a minimum depth or auger refusal. In such cases, the augers may be left in place as temporary surface casing, with the center plug removed and drilling/coring carried out through the augers. Alternatively, a shallow conductor casing, or surface casing, may be set by drilling to a desired depth with a large-diameter bit, then setting the casing and proceeding with the drilling/coring. After total drill depth (TD) is reached, the borehole may be logged by geophysical means or hydraulically tested. If casing is not set to the bottom of the borehole, the lower portion of the hole may be grouted or backfilled accordingly The borehole may be drilled out (reamed) Upon reaching TD, drilling fluid is circulated to remove cuttings. Selected casing is then run into the borehole and set to the desired depth. Monitoring wells are cased with clean, threaded, factory-perforated and blank casing. The perforated interval consists of slotted casing, generally with 0 020-inch-wide by 1.5-inch-long slots, with 42 slots per foot Centering devices may be fastened to the casing the ensure even distribution of filter material and grout within the borehole annulus. The well casing is thoroughly washed and/or steam cleaned, or may be purchased as pre-cleaned, prior to installation. All recoverable drilling fluid and/or cuttings are collected for temporary storage and disposed of properly pending analytical results.

After setting the casing, sand or gravel filter material is poured into the annular space to fill from boring bottom to generally 1 foot above the perforated interval A 1- to 2-foot-thick bentonite plug is set above this filter material to prevent grout from infiltrating the filter pack. Either neat cement, containing about 5 percent bentonite, or sand-cement grout is then tremmied into the annular space from the top of the bentonite plug to near surface A traffic-rated vault is installed around each wellhead for wells located in parking lots or driveways, while steel "stovepipes" are usually set over wellheads in landscaped areas.

After installation, the wells are thoroughly developed to remove residual drilling materials from the wellbore, and to improve well performance by removing fine material from the filter pack that may pass into the well. Well development techniques used may include pumping, surging, bailing, swabbing, jetting, flushing, and air-lifting All development water is collected either in drums or tanks for temporary storage, and properly disposed of pending laboratory analytical results. To minimize the potential for cross-contamination between wells, all development equipment is either steam cleaned or properly washed prior to use. Following development, the well is allowed to stand undisturbed for a minimum of 24 hours before its first sampling.

SOP-9
VAPOR SAMPLING: "TEDLAR" BAG SAMPLING TECHNIQUE

Prior to vapor sampling, the vacuum system must reach a stabilized air flow (cubic feet per minute) for approximately 15 minutes. Prior to the actual collection of the vapor sample, the following data is recorded: air flow, temperature, and pressure at collection ports and gauges.

The sampling equipment consists of a "Tedlar" bag (available in 1, 3, 5, and 10 liter sizes), a diaphragm pump, and 1/4-inch-diameter polyethylene tubing (approximately 1 foot long)

The sampling ports are brass connections, fitted with a silicone septa, and threaded into a tapped hole in the system piping. The sampling procedure requires one end of the tubing be slipped over the sampling port and the other end over the diaphragm pump to acquire an air-tight connection. The sampling pump is purged for 1 minute with the extracted vapor to be sampled Following purging, the discharge of the pump is then diverted through a two-way valve into the "Tedlar" bag, which should be filled to 3/4 of volume capacity Caution should be taken not to overfill the sampling bag The sample is placed in a non-refrigerated dry cooler with sufficient packing to eliminated damage during transport. Cooling samples will cause condensation of moisture within the sample, thereby distorting laboratory analysis.

For quality control purposes, a duplicate vapor sample should be collected from each sampling port. This sample is then put on hold at the laboratory pending initial analysis. To ensure quality control and minimize the potential for cross-contamination prior to and during sampling, the diaphragm pump is thoroughly purged for approximately 5 minutes with nitrogen or clean air (i.e., compressed clean air). A "blank" sample of the discharged air is captured in a

as necessary with a large-diameter bit.

"Tedlar" bag at the end of the purging procedure and may be analyzed to ensure the purging was effective.

To minimize the potential for cross-contamination between air samples, the polyethylene tubing, if not sample dedicated, is thoroughly cleaned and rinsed
Vapor samples are subject to very limited holding times, typically 48 hours. Thus, care must taken to avoid delays in submittal of vapor samples to the laboratory. In the event the vapor samples cannot be submitted to the analytical laboratory on the same day they are collected, they are to be temporarily stored in the dry, non-refrigerated, packed cooler until the very first opportunity for submittal well within the required holding time, taking into account the time needed for shipment to and receipt by the laboratory.

SOP-10
VAPOR SAMPLING: SYRINGE SAMPLING TECHNIQUE

Prior to vapor sampling, the vacuum system must reach a stabilized air flow (cubic feet per minute) for approximately 15 minutes. Prior to the actual collection of the vapor sample, the following data is recorded: air flow, temperature, and pressure at collection ports and gauges.

The sampling equipment consists of a clean, 100cc, gas-tight syringe and silicone septa.

The sampling ports are brass connections, fitted with silicone septa, and threaded into a tapped hole in the system piping. Samples are collected by inserting a clean syringe into the septum and the plunger actuated several times. Each syringe should be purged of three syringe volumes before collecting the sample. On the fourth purge, the plunger is extracted slowly until the syringe is filled with a gas sample, then the syringe is withdrawn and the needle immediately plugged with a silicone stopper. The sample should be placed in a non-refrigerated, dry cooler with sufficient packing to eliminate breakage during transport. Cooling samples will cause condensation of moisture, thereby distorting laboratory analysis.

For quality control purposes, a duplicate air sample should be collected from each port This sample is put on hold at the laboratory pending initial analysis.

Vapor samples are subject to very limited holding times, typically 48 hours. Thus, care must taken to avoid delays in submittal of vapor samples to the laboratory. In the event the vapor samples cannot be submitted to the analytical laboratory on the same day they are collected, they are to be temporarily stored in the dry, non-refrigerated, packed cooler until the very first opportunity for submittal well within the required holding time, taking into account the time needed for shipment to and receipt by the laboratory

SOP-11
VAPOR SAMPLING: CANISTER SAMPLING TECHNIQUE

Prior to vapor sampling, the vacuum system must reach a stabilized air flow (cubic feet per minute) for approximately 15 minutes. Prior to the actual collection of the vapor sample, the following data is recorded: air flow, temperature, and pressure at collection ports and gauges.

The sampling equipment consists of a sterilized, gas-tight, "Vacu-Sampler" stainless steel canister, and 1/4-inch-diameter polyethylene tubing approximately 2 feet in length.

The sampling ports are brass connections fitted with silicone septa and threaded into a tapped hole in the system piping. The sampling procedure requires one end of the tubing to be slipped over the sampling port and the other end over the canister nozzle to acquire an air-tight connection. The actuator on top of the canister is depressed for 10 seconds. At the end of the 10 seconds, the canister is disconnected from the tubing and the tubing is disconnected from the sampling port. Immediately following the sample collection, complete sampling information is recorded on the label on the air sampling canister (e.g., sample ID, date, time, location, and temperature). The sample is placed in a non-refrigerated, dry cooler with sufficient packing to ensure against For quality control purposes, a duplicate vapor sample should be collected from each sampling port. This sample is then put on hold at the laboratory pending the initial analysis. To minimize the potential for cross-contamination between vapor samples, the polyethylene tubing, if not sample dedicated, is thoroughly cleaned and rinsed

Vapor samples are subject to very limited holding times, typically 48 hours. Thus, care must taken to avoid delays in submittal of vapor samples to the laboratory. In the event the vapor samples cannot be submitted to the analytical laboratory on the same day they are collected, they are to be temporarily stored in the dry, non-refrigerated, packed cooler until the very first opportunity for submittal well within the required holding time, taking into account the time needed for shipment to and receipt by the laboratory.

SOP-12
MEASURING LIQUID LEVELS USING WATER LEVEL METER OR INTERFACE PROBE

Field equipment used for liquid-level gauging typically includes the measuring instrument (water-level meter or interface probe) and product bailer(s). The field kit also includes cleaning supplies (buckets, solution, spray bottles, and deionized water) to be used in cleaning the equipment between wells

Prior to measurement, the instrument tip is lowered into the well until it touches bottom. Using the previously established top-of-casing or top-of-box (i.e., wellhead vault) point, the probe cord (or halyard) is marked and a measuring tape (graduated in hundredths of a foot) is used to determine the distance between the probe end and the marking on the cord. This measurement is then recorded on the liquid-level data sheet as the "Measured Total Depth" of the well.

When necessary in using the interface probe to measure liquid levels, the probe is first electrically grounded to either the metal stove pipe or another metal object nearby. When no ground is available, reproducible measurements can be obtained by clipping the ground lead to the handle of the interface probe case.

The probe tip is then lowered into the well and submerged in the groundwater. An oscillating (beeping) tone indicates the probe is in water. The probe is slowly raised until either the oscillating tone ceases or becomes a steady tone. In either case, this is the depth-to-water (DTW) indication and the DTW measurement is made accordingly. The steady tone indicates floating liquid hydrocarbons (FLH). In this case, the probe is slowly raised until the steady tone ceases. This is the depth-to-product (DTP) indication and the DTP measurement is made accordingly.

The process of lowering and raising the probe must be repeated several times to ensure accurate measurements. The DTW and DTP measurements are recorded on the liquid-level data sheet. When FLH are indicated by the probe's response, a product bailer is lowered partially through the FLH-water interface to confirm the FLH on the water surface and as further indication of the FLH thickness, particularly in cases where the FLH layer is quite thin. This measurement is recorded on the data sheet as "FLH thickness."

In order to avoid cross-contamination of wells during the liquid-level measurement process, wells are measured in the order of "clean" to "dirty" (where such information is available). In addition, all measurement equipment is cleaned with solution and thoroughly rinsed with deionized water before use, between measurements in respective wells, and at the completion of the day's use

damage during transport. Cooling samples will cause condensation of any moisture within the air sample, thereby distorting laboratory analysis.